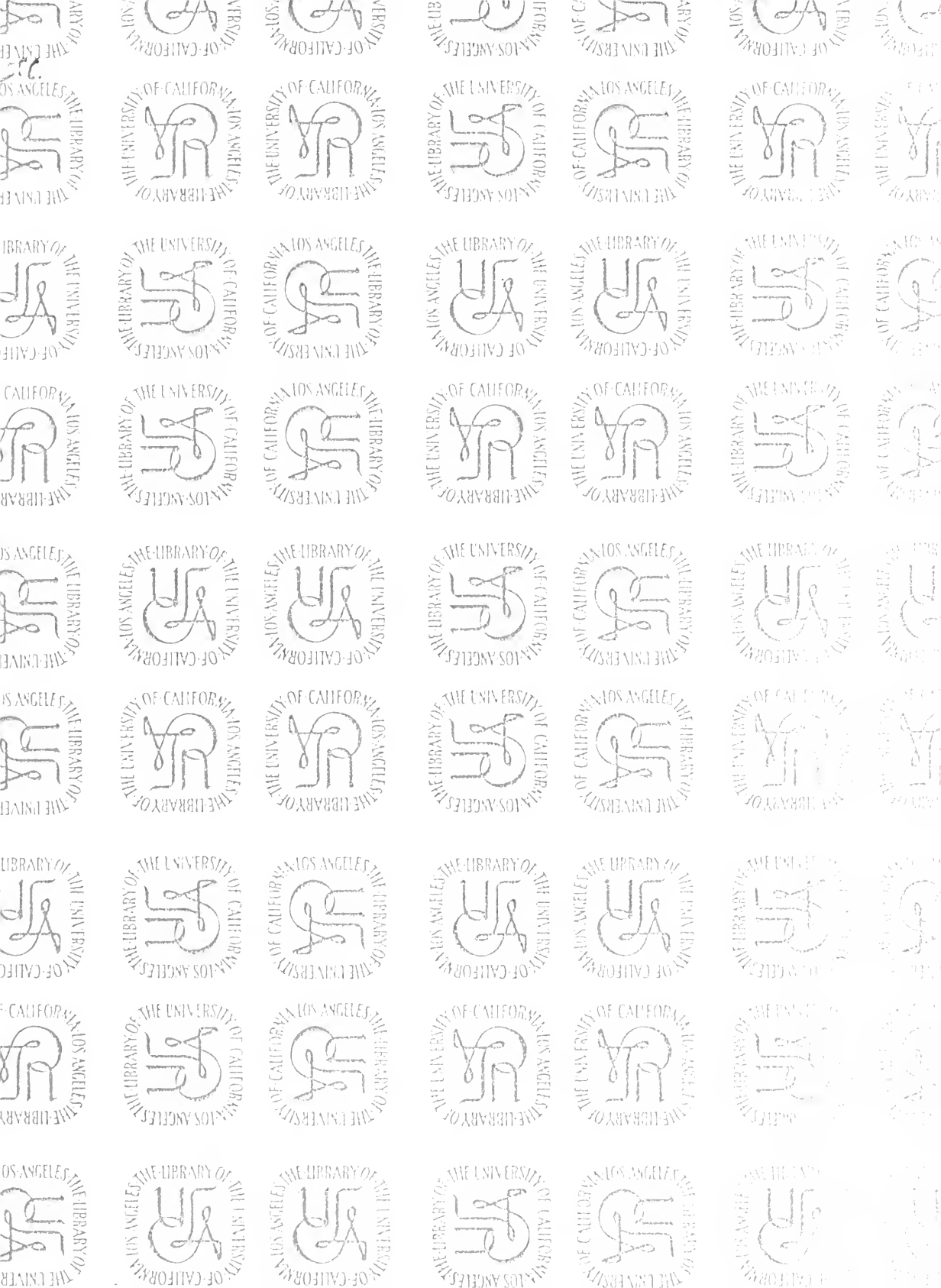
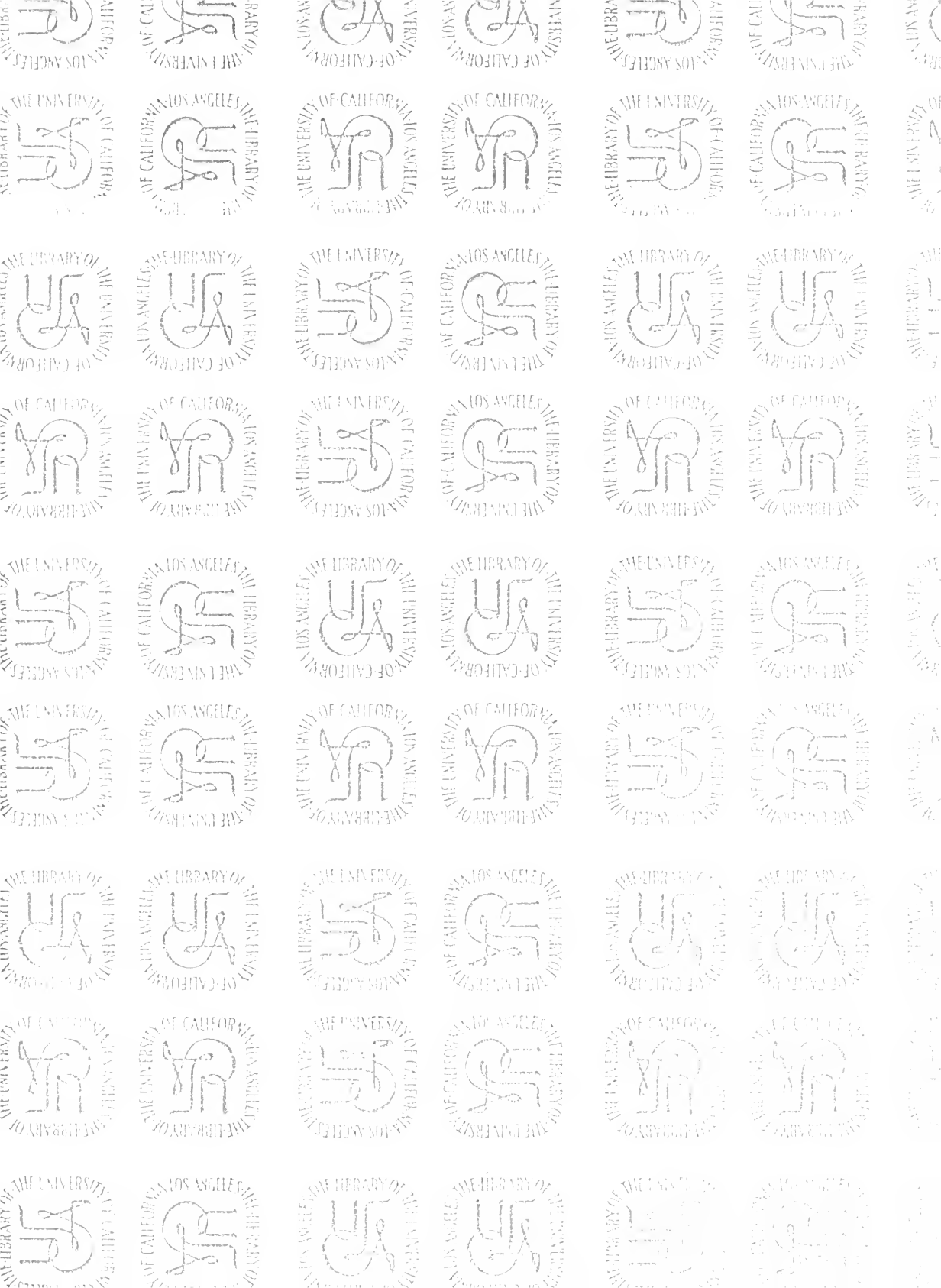
☆CJ
839
L26o

AA 000 101 817 5

UC SOUTHERN REGIONAL LIBRARY FACILITY


THE LIBRARY OF THE UNIVERSITY OF CALIFORNIA LOS ANGELES


THE UNIVERSITY OF CALIFORNIA LOS ANGELES
THE LIBRARY OF THE UNIVERSITY OF CALIFORNIA LOS ANGELES

Digitized by the Internet Archive
in 2007 with funding from
Microsoft Corporation

http://www.archive.org/details/observationsondo00langiala

OBSERVATIONS

ON

DOCTOR *ARBUTHNOT*'s

DISSERTATIONS

ON

COINS, WEIGHTS, and MEASURES.

By *BENJAMIN LANGWITH*, D.D.
Late Rector of *Petworth* in *Suſſex*.

LONDON:

Printed for DAN. BROWNE at the *Black Swan* without *Temple-Bar*, and JOHN WHISTON at Mr. *Boyle*'s Head in *Fleet-ſtreet*, MCCXLVII.

[Price 2*s*. 6*d*.]

839
L260

To Her GRACE the

Ducheſs of *SOMERSET.*

MADAM,

I OFFER theſe Papers to You, becauſe I have been long deſirous of making a public Acknowledgement of the great Obligations the deceaſed Author and preſent Editor have owed to his Grace of SOMERSET, and Your Self. Was I as able to deſcribe the Variety of Accompliſhments You are Miſtreſs of as I am ready to own the Favours I have received, You are the only Perſon in the World who would read them with Uneaſineſs; but my Incapacity to do Juſtice to Your Virtues, prevents my offending one which gives a Luſtre to all

876990

all the reſt. However, Your Liberality and Benevolence which I have gratefully felt, tho' I cannot ſuitably expreſs, ſhall live imprinted on the Mind of, MADAM,

YOUR GRACE'S

Moſt Obliged,

and moſt Obedient

Humble Servant,

Sarah Langwith.

OBSERVATIONS

ON

DOCTOR *ARBUTHNOT*'s

DISSERTATIONS

ON

COINS, *WEIGHTS*, and *MEASURES*.

I AM very much obliged to Dr. *Arbuthnot* for giving me more Light into many curious Subjects, than I could have had without much Expence of Time and Labour. But this has not hindered me from making the following Strictures upon ſome Parts of his Work, in Hopes that one time or other they may contribute to its being brought to more Exactneſs and Perfection.

CHAP. I.

Of the ROMAN *Pound.*

I AM ſorry to find, upon reading his Chapter of the *Denarius*, *p.* 15, that the *Doctor* has gone upon wrong Principles, and that his Tables of Weights and Coins are not

only loaded with uſeleſs Fractions, but are not ſo near the Truth as might be wiſh'd. The wrong Principles, thoſe I mean which he had from Mr. *Greaves*, are as follow:

1. That the *Roman* Ounce is the ſame with the *Engliſh Avoirdupois*.

2. That the *Engliſh Penny* weighs *eight Grains*.

Mr. *Greaves* has been follow'd in the firſt of theſe Principles, not only by Dr. *Arbuthnot*, but by Biſhop *Hooper* and Mr. *Smith*; tho' I believe it will be eaſy enough to prove it wrong. In order to this, let us firſt find the Value of the *Avoirdupois* Ounce; then that of the *Roman* in Grains Troy.

By an Experiment in *Ward*'s *Young Mathematician's Guide*, *p.* 32, it appears, that a *Pound Avoirdupois* weighs 14 *oz.* 11 *pw.* 15 $\frac{1}{2}$ *gr.* or 6999.5 Grains Troy.

He calls this Experiment a nice one, and I have Reaſon to believe it ſo, for I made the ſame myſelf, and find but a trifle of a Difference.

I fancy Mr. *Greaves* made the ſame Experiment, by weighing a Standard *Avoirdupois* Pound with Troy Weights; and was the firſt who determin'd the Proportion of the *Avoirdupois* Pound to the *Troy* Pound to be as 175 to 144, and conſequently the *Avoirdupois* Ounce to be 437 $\frac{1}{2}$ Grains Troy, which differs very little from the *Avoirdupois* Ounce fetch'd out by Mr. *Ward*'s Pound of 6999.5; for if 6999.5 be divided by 16, the Number of Ounces in an *Avoirdupois* Pound, it will give

The *Avoirdupois* Ounce 437.468, *&c.* Grains Troy, which falls ſhort of the foremention'd *Avoirdupois* Ounce 437.5 by only 0.032 of a Grain. The foremention'd Proportion alſo is uſed by Biſhop *Hooper*, but whence he had it we are not told. *Vide* Arbuthnot, *p.* 283.

As for Dr. *Arbuthnot*, in order to find the *Avoirdupois* Ounce, which he will have to be the *Roman*, tho' without

any

any manner of Proof, he firſt makes uſe of the Proportion of the *Avoirdupois* Pound to the Troy Pound, as 175 to 144, which would bring out the *Avoirdupois* Ounce 437½ Grains Troy, and being multiply'd by 12 gives what he calls the *Roman* Pound.

Afterwards he changes his Proportion of the Pounds for a much worſe, from Dr. *Wybert*, *viz.* inſtead of 175 to 144, he makes uſe of 17 to 14, throwing off the laſt Figures in the former Numbers.

By this Preparation, the *Avoirdupois* Ounce will come out 437.142 Grains *Troy*, and what he calls the *Roman* Pound 5245.704 Grains *Troy*, which he makes uſe of in his Tables. This new *Avoirdupois* Ounce of his, differs more from the true *Avoirdupois* Ounce, than the Former, for that differed from it only by 0.032 of a Grain, this by 0.326 of a Grain.

The *Avoirdupois* Ounce being thus ſettled at 437.468 Grains *Troy*, let us next enquire after

The ROMAN *Ounce.*

I know no better Way of coming to this, than by the Weight of the *Denarius*; for ſince it is agreed that 7 *Denarii* make an Ounce, if we have the Weight of the *Denarius*, we have that of the Ounce too. The Queſtion is, how we ſhall know the Weight of the *Denarius?* One would think the Anſwer was eaſy. ——By weighing it.

This Mr. *Greaves* has done; and having in *Italy*, and elſewhere, peruſed many hundred *Denarii Conſulares*, he found by frequent and exact Trials, the beſt of them to amount to 62 Grains *Troy* *. Surely this is a more natural

* The *Denarius* is certainly ſet high enough at 62 Grains, and it is not common to meet with one that weighs ſo much. I have but one in my Collection that comes near it; and in that great Number, whoſe Weights Mr. *Thoreſby* ſent to Mr. *Smith*, there is but one of 62 Grains.

tural way of coming at the Weight of the *Conſular Denarius* than the round-about Methods by *Veſpaſian*'s *Congius*, *Inch Meaſure*, &c. The Imperfections of ſome, or all of which, I ſhall ſhew hereafter.

I am ſenſible that Biſhop *Hooper* ſets the *Denarius* at 64 Grains; but I do not know how he could make it out, nor indeed how to reconcile this with his Notions, that the *Avoirdupois* Ounce conſiſts of 437.5 Grains *Troy*, which it muſt do according to the Proportion which he makes uſe of, and the Suppoſal that the *Roman* and *Avoirdupois* Ounces are the ſame; for if the *Roman Denarius* be 64 Grains, the Ounce muſt be 64×7=448 Grains *Troy*, which exceeds his *Avoirdupois* or *Roman* Ounce, by no leſs than 10.5 Grains.

We are told of *Denarii* of very large Sizes by Mr. *Thoreſby*; but theſe are nothing to the Purpoſe, ſince he himſelf neither takes them to be Conſular, nor indeed ſo much as ſtruck at *Rome*. Vide *Duc. Leod.*

Dr. *Bernard* is alſo quoted by Mr. *Smith*, *p.* 154, as having ſeen ſome *Denarii* of *Druſus*, which amounted to 62 *gr.* $\frac{4}{7}$. I cannot help taking this to be accidental; however, it may well enough be accounted for. I ſuppoſe they were the *Denarii* of that *Druſus*, who, as we are told by *Pliny*, mixed no leſs than an eighth Part of Braſs with the Silver: So that it is no wonder if he was not ſo nice in his Weight as to trouble himſelf about $\frac{4}{7}$ of a Grain.

I ſhall therefore ſtick to 62 Grains *Troy* for the weight of the *Denarius*, at which Rate the *Roman* Ounce will be 434 Grains *Troy*, the *Roman* Pound 5208 Grains *Troy*, or 10 ℔. 17 *pw. Troy*.

The Difference between the *Roman* and *Avoirdupois* Ounce will now plainly appear: For ſince the *Roman* Ounce contains only 434 Grains *Troy*, but the *Avoirdupois* 437.468, *&c.* the *Avoirdupois* Ounce will exceed the *Roman* by 3.468, *&c.* which does not ſeem to be much in the Ounce, but will make

make a great Difference when it comes to be multiplied by 12, or a greater Number.

Dr. *Arbuthnot*'s Tables of Weights then are imperfect by his making the *Roman* Ounce, and conſequently all the correſponding Weights, too heavy; for according to his Tables, the Ounce ought to be 437.142 Grains *Troy*; ſo that his *Roman* Ounce exceeds the true *Roman* Ounce of 434 Grains by 3.142 Grains *Troy*.

We muſt not yet diſmiſs this Point; for Mr. *Greaves* had ſo ſtrong an Opinion, that the *Roman* Ounce, and *Avoirdupois* Ounce, was the ſame; that not being content with the *Denarius* of 62 Grains, with its correſponding Ounce 434 Grains, he caſts about for a new *Denarius*, whoſe correſponding Ounce might be nearer the *Avoirdupois* Ounce. What this *Denarius* and Ounce were, we ſhall quickly ſee.

In the mean time, I cannot help wondering why Mr. *Greaves*, *&c.* ſhould imagine we had our *Avoirdupois* Ounce from the *Romans*; for,

1. By the Name of it, I ſhould imagine much rather, that we had it from the *French*.

2. If we had the *Avoirdupois* Ounce from the *Romans*, it is ſtrange we had not the Pound too, which then would have conſiſted of 12 Ounces inſtead of 16.

3. It is plain it does not anſwer the Weight of the Conſular *Denarii*. Theſe are to me probable Arguments at leaſt, that the *Romans* did not leave their Ounce in *Britain*, as Dr. *Arbuthnot* aſſerts.

I ſhall now proceed to Mr. *Greaves*'s ſecond *Denarius*, which is 62 $\frac{4}{7}$ Grains *Troy*. This *Denarius* exceeds the Former by $\frac{4}{7}$ of a Grain, which he is obliged to maintain, were loſt in the Coins by the Coinage, *&c.* This *Denarius*

is

is fetched from the *Congius of Veſpaſian*, by *Villalpandus*, in the following manner:

The *Congius* called *Veſpaſian*'s, being marked on the Outſide P. X. is ſuppoſed to have contained ten *Roman* Pounds. This Veſſel *Villalpandus* filled with Water, and found it to contain ten *Roman* Pounds, ſuch as are uſed at preſent in *Rome*. He thence concludes, that the preſent *Roman* Pound, and the ancient *Roman* Pound, are the ſame. His Concluſion would be juſt, was it certain that the *Congius* was exact, and that the Experiments were made with that exquiſite Nicety, that Experiments in weighing of Water, eſpecially in ſuch large cumberſome Veſſels, require. Mr. *Greaves*, upon the Credit of *Villalpandus* [for I do not find that he weighed the Contents of the *Congius* himſelf] took the ancient *Roman* and preſent *Roman* Pound to be the ſame. After this I ſuppoſe he weighed the preſent *Roman* Pound with *Troy* Weights, and found it to contain 5256 Grains *Troy*, and conſequently, that the Contents of the *Congius* being ten Pound, were 52560 Grains *Troy*. Theſe 52560 Grains being divided by 840, the Number of the *Denarii* in 10 *Roman* Pounds, will give 62 $\frac{480}{840}$, or 62 $\frac{4}{7}$ for the *Roman Denarius*, whoſe correſpondent Ounce will be 438 Grains *Troy* *.

This Ounce from the *Congius* differs but little from the *Avoirdupois* Ounce 437.468, *viz.* 0.53, *&c.* of a Grain; ſo that they might well enough paſs for the ſame, if ſo near an Agreement had been proved any other way. But I am afraid the Arguments taken from this *Congius* are far from being concluſive, and that for the following Reaſons, which ſurely ſo curious and exact a Perſon as the excellent Mr. *Greaves* could not but have thought of, had he not been prejudiced in favour of an Opinion which is inconſiſtent with them.

* Vide *Ward*'s *Diſſertation de Aſſe*, in *Aynſworth*'s *Monumenta Kempiana*.

them. The Reaſons why I think the Arguments from the *Congius* inconcluſive are,

I. In general, becauſe I think no Water Meaſure can be exact, and that,

1. Becauſe different Waters have different Weights, Rain-Water differs from Spring-Water, and the Water of one Spring from that of another.

2. Becauſe the Weather makes an Alteration in the Weight of Water, ſince, according to Mr. *Homberg*, the ſame Quantity of Water [I ſuppoſe he means of the ſame Kind of Water] which in Winter weighed 474 Grains, weighed in Summer only 470 Grains, and conſequently loſt ſomething above $\frac{1}{113}$ Part of its Weight. *Vide* Arbuthnot, *p.* 82.

3. Becauſe there is much Difficulty in filling Veſſels with Water to great Exactneſs; for if the Veſſel be well dried and cleanſed with Bran or Flower, the Water will ſtand in a Crown above the Brims, and be heavier than the Dimenſions of the Veſſel require; but if this Water be taken off with a Strike, it will not touch the Brims of the Veſſel, and ſo be lighter than the Dimenſions of it require. Thus much as to the Uncertainty of Water-Meaſure in general. I come to conſider,

II. Why Arguments from this *Congius*, in particular, are inconcluſive; and that,

1. Becauſe it is neither rectangular nor cylindrical, but bulges out in the Belly, and therefore could never be deſigned for an exact Meaſure, ſince without a great deal of Trouble, Part of the Liquor in pouring it out would be left behind. Perhaps they made it larger than ordinary, partly to allow for this Inconvenience, and partly to allow for the Liquor

Liquor that might be daſhed about in pouring it in and out; for that it was larger than ordinary, is certain;

3. Becauſe the *Denarius* and Ounce taken from it are larger than ordinary.

4. Becauſe the Foot taken from it is larger than ordinary; for the Foot taken from this *Congius* would be 11.84 Inches, differing from the *Coſſutian* Foot by an Exceſs of near $\frac{1}{5}$th of an Inch. *Vide* Arbuthnot, *p.* 81.

5. What is worſt of all, it is ſuſpected to be ſpurious. *Vide Gruter Inſcript.* vol. 1. *p.* 233. Though no Reaſons are offered there why it is ſuſpected, yet to ſay nothing of the abſurd improper Figure of it, I think a very good Argument to prove it a Counterfeit may be taken from the Inſcription upon it, which runs thus:

IMP. CAESARE
VESPAS. VI. COS
T. CAES. AVG. F. IIII
MENSVRAE
EXACTAE IN
CAPITOLIO
P. X

To ſay nothing of the other Parts of the Inſcription which are ſuſpicious enough, the Omiſſion of COS in the third Line before IIII. is ſufficient for me to judge it ſpurious. I think at leaſt, it is not of Authority enough to ſupport the Notion grounded upon it, that the *Avoirdupois* and *Roman* Ounces are the ſame. I have alſo ſhewed the Miſchief that Dr. *Arbuthnot* has done his Tables by falling into this Error.

There is ſtill another Eſtimate of the *Denarius* at *p.* 15, from a Model of the *Congius* of *Veſpaſian*, which is hardly worth mentioning. This makes the *Denarius* $62\frac{361}{430}$, or 62.839 Grains *Troy*. At this Rate, the Ounce will be 439.873, and the Pound 5278.476 Grains *Troy*.

By

By ſetting, as I have done, the *Roman* Ounce at 434 Grains *Troy*, and the *Roman* Pound at 5208 Grains *Troy*, neither the Ounce nor the Pound are incumbered with Fractions, which cannot be ſaid either of Dr. *Arbuthnot*'s Ounce or Pound.

It may perhaps create a Prejudice to my Eſtimate of the *Roman* Ounce and *Denarius*, when it is conſidered that ſuch great Men as Mr. *Greaves*, Biſhop *Hooper*, and Dr. *Arbuthnot* have ſet them higher than I have done. In order to balance theſe great Authorities, I ſhall take in the Aſſiſtance of *Lucas Pætus*, and *Savotus*, two very learned Men, and curious Obſervers, whoſe Ounce and *Denarius* are much lower than mine.

1. As to *Pætus*, he tried a very nice Experiment with an Amphora, made by the *Roman* Foot, and a proportionable *Sextarius*, of which an Account may be met with in *Ward de Aſſe*, p. 48. The Reſult of his Experiment was, that the *Roman* Pound conſiſted of 5000.5 Grains *Troy*. This Pound, which is lighter than Mr. *Greaves*'s of 5256 by 255.5 Grains, will give the Ounce 416.708 Grains, and the *Denarius* 59.529 Grains *Troy*.

2. *Savotus* makes this ſtill too much, and by weighing many Gold and Silver Coins, concludes, that 68 of our Grains *Troy* are to be taken from *Pætus*'s Pound, in order to bring it right. Thus his *Roman* Pound will be 4932.5, his Ounce preciſely 411.041 Grains *Troy*, his *Denarius* 58.72 Grains *Troy*.

Pætus's Pound of 5000.5 falls ſhort of mine 5208 by 207.5 Grains *Troy*.

Savotus's of 4932.5 Grains *Troy* falls ſhort of mine by 275.5 : So that according to them my Pound is much too large; and inſtead of falling ſhort of Mr. *Greaves*'s, by only 48 Grains *Troy*, it ought to do it by 4 or 5 times as much.

The ſame may be ſaid in Proportion of the Ounce and *Denarius*.

I ſhall not however quit my Eſtimate of the Ounce, &c. for either of theirs.

1. Not for *Pætus*'s: I do not doubt of the exceeding great Care and Exactneſs of *Pætus*; but, for Reaſons given before, I cannot think Water-weight any thing near ſo exact as ſolid Weight. But there is another Objection againſt his Eſtimate; for it is very doubtful whether the Amphora from the Foot be exact. It certainly comes near the Amphora found by Weight, but cannot be proved to be the ſame. *Vide* Biſhop *Hooper* in *Arbuthnot*, p. 81. It ſeems to be ſomething leſs, and ſo brings down the Weight of the Ounce, &c.

2. As to *Savotus*, he is an Adverſary worſe to manage, for his exquiſite Nicety about Coins is well known; and he fetched out his Pound, &c. by weighing Gold and Silver Coins; ſo that it is ſtrange that his *Denarius* ſhould differ ſo much from Mr. *Greaves*'s of 62 Grains *Troy*. All that I can ſay to it is, that either the Coins he met with were not ſo perfect as Mr. *Greaves*'s, or elſe, that having weighed ſeveral, he choſe to ſet them at ſome middle Rate, rather than at the higheſt or the loweſt.

I ſhall juſt take notice, that the *As Libralis*, even when fair, does not weigh above 9 Ounces *Troy*, which is a probable Argument, at leaſt, that my Pound is not ſet too low at 10 ℥, 17 *pw*.

Several of theſe Particulars may be ſeen in Mr. *Ward*'s *Diſſertation de Aſſe*, in *Monument. Kempian.* from *p.* 46, to *p.* 62. And yet after all, this Author chuſes to ſtick to Mr. *Greaves*'s Computation; and that for a very odd Reaſon, *viz.* that it is uſed by our Authors, particularly Dr. *Arbuthnot*; as if it was not better to correct our Authors, and, particularly,

Dr.

Dr. *Arbuthnot* as well as the reſt, than follow them in their Errors.

The Computation that he talks of, is that which ſets the *Denarius* as $62\frac{4}{7}$ Grains *Troy*, and the Penny at 8 Grains; which latter is undoubtedly falſe, as I ſhall ſhew, after having given the Pounds, Ounces, and *Denarii* mention'd in theſe Papers at one View.

	Pound.	*Ounce.*	*Denarius.*
Greaves's Computation from *Villalpandus* gives, - - -	5256	438	$62\frac{4}{7}$
Dr. *Arbuthnot*'s, - - - - -	5245.752	437.142	62.448
Mine from the *Denarius* - -	5208	434	62
Pætus's, - - - - - - - - -	5000.5	416.708	59.529
Savotus's, - - - - - - - - -	4932.5	411.041	58.72
Another in *Arbuthnot*, - - -	5250	437.5	62.5

I wonder the *Doctor* did not ſtick to this Pound, which is a whole Number, eſpecially, ſince the Ounce of it is near the *Avoirdupois* Ounce, which he takes to be the *Roman*.

The Difference between his Pound of 5245.752, *&c.* mine 5208 is 37.752, *&c.* Grains *Troy*, which is little more than $\frac{1}{152}$ of a Pound *Troy*; conſequently in a little more than 152 Pounds Weight, his would exceed mine by a Pound *Troy*. I think I have proved mine to be the true *Roman* Pound; and if I have, it is plain that his is too heavy. It is plain alſo from what went before, that his Over-weight was chiefly owing to his following Mr. *Greaves* in his Notion, that the *Roman* Ounce and *Avoirdupois* Ounce are the ſame.

I ſhall now give an Account of the *Roman* Weights according to my Computation, and then ſhall proceed to the Conſideration of his ſecond general Miſtake, which has ſpoiled his Tables of Money, as the firſt did thoſe of Weight.

		Gr. Troy.	ʒ	*Pwt.*	*qr.*
My *Roman* Pound, is - -		5208	10	17	00
Ounce, - -	$\frac{1}{12}$	434	00	18	02
Duella, - -	$\frac{1}{36}$	$144\frac{2}{3}$	00	06	$00\frac{2}{3}$
Sicilicus, - -	$\frac{1}{48}$	$108\frac{1}{2}$	00	04	$12\frac{1}{2}$
Sextula, - -	$\frac{1}{72}$	$72\frac{1}{3}$	00	03	$00\frac{1}{3}$
Drachma, - -	$\frac{1}{96}$	$54\frac{1}{4}$	00	02	$06\frac{1}{4}$
Scriptulum -	$\frac{1}{288}$	$18\frac{1}{2}$	00	00	$18\frac{1}{2}$
Obolus, - -	$\frac{1}{576}$	$9\frac{1}{24}$	00	00	$9\frac{1}{24}$
Siliqua, - -	$\frac{1}{1728}$	$3\frac{1}{72}$	00	00	$3\frac{1}{72}$
Lens, - -	$\frac{1}{6912}$	$0\frac{217}{288}$	00	00	$0\frac{217}{288}$

I am aware that it would have been better to have thrown the common Fractions into the Decimals in this Table; but I have drawn it up in this manner to make it more eaſy to be compared with Dr. *Arbuthnot*'s.

This over-rating the *Roman* Weights, will occaſion Diſorder in the Eſtimate of the Meaſures both wet and dry.

CHAP.

CHAP. II.

Of the Value of ROMAN *Money in* ENGLISH *Coin.*

I SAID in the Beginning of the laſt Chapter that the *Doctor*'s Tables of Coins are not ſo exact as might be wiſh'd, which was partly occaſion'd by his following Mr. *Greaves* in two Inaccuracies. The firſt has been treated of.

The ſecond is, That he has ſet the *Engliſh* Penny at 8 Grains *Troy*, and in conſequence the *Denarius* at 7 *d.* $\frac{3}{4}$ *Engliſh*; which is too low.

If a Pound Sterling of Silver was coin'd into 60 Shillings, or what is the ſame thing, the Ounce of Silver, into 60 Pence, then indeed the Penny would be 8 Grains *Troy*.

For as 60 *d.* : 480 *gr.* : : 1 *d.* : 8 *gr.* thus alſo
as 480 *gr.* : 60 *d.* : : 62 *gr.* : 7 *d.* $\frac{3}{4}$

Both Dr. *Arbuthnot* and Mr. *Greaves*, knew well enough that an Ounce was coin'd into 62 Pence; but in order to ſave a little Trouble in Calculation, ſet it at 60 Pence. They would have ſaved a great deal more Trouble by ſetting it right; ſince by that the *Denarius* would have come out at about 8 *d.* the *Quinarius* at 4 *d.* and the *Seſtertius*, by which all great Sums are eſtimated, at the round Number 2 *d.* which may be thus made out.

If 480 the Number of Grains *Troy* in an Ounce give 62 Pence, then will 62 Grains, which are contain'd in a *Denarius*, give $8.008^{d.}$, *&c.*

As

	gr.	*d.*		*gr.*	*d.*
As	480	62	: :	62	8.008, or,
As	480	62	: :	62	8 $\frac{1}{120}$

The Fraction 0.008 or $\frac{1}{120}$. may well enough be omitted, tho' in 120 *Denarii* it would amount to an *Engliſh* Penny. It is certain from *Pliny*, Edit. *Hard. Tom.* I. *p.* 627, *Fol.* that the Mint-Maſters did not always make the *Denarii* of the juſt Weight, which perhaps may be one Reaſon why amongſt the many fair *Conſular Denarii*, as they are called, ſo few come up to the Weight of 62 Grains *Troy*.

I ſhall conclude therefore, that the *Denarius* is 8 Pence, that it is ſet a Farthing too low at 7*d.* $\frac{3}{4}$, and the *Seſtertius* a Quarter of a Farthing too low at 1 *d.* 3*f.* $\frac{3}{4}$.

A Quarter of a Farthing ſeems to be an inconſiderable Thing; but when it comes to be multiplied, as the Sums which we often meet with in the *Roman* Hiſtory require, it will then appear to be of more Conſequence. I ſhall inſtance only in *Centies H. S.* which was no uncommon Eſtate among the *Romans* after the Conqueſt of *Carthage*, *Greece*, *Aſia*, &c. *Centies H. S.* ſuppoſing the *Seſtertius* to be 1 *d.* 3*f.* $\frac{3}{4}$, would amount to 80729*l.* 3*s.* 4*d.* but ſetting the *Seſtertius* $\frac{1}{4}$ of a Farthing higher, or, in other Words, at 2*d.* the Sum will be 83333*l.* 6*s.* 8*d.* the Difference 2604*l.* 3*s.* 4*d.*

The former Concluſion will be confirm'd, by conſidering what the real Weight and Value of the 60 Pence or Crown, and Penny will be, when the Ounce is coin'd into 62 Pence: The Value of the Crown in this Caſe will be no more than 58 *d.* and about $\frac{1}{4}$ of a Farthing, the Weight of it no more than 19 *pw.* 8 *gr.* $\frac{1}{2}$, with ſome exceeding ſmall Fraction. The Penny at the ſame Rate will be no more in Value than 3*f.* $\frac{54}{62}$, ſuppoſing the Ounce to be 60 Pence, nor in Weight than 7*gr.* $\frac{46}{62}$, or 7 *gr.* 74, *&c.* ſo that it was over-rated in Weight by

by Mr. *Greaves* and Dr. *Arbuthnot*, ſomething more than a Quarter of a Grain, *viz.* $\overset{gr.}{0}\ 26$; which in 8 *d.* would amount to $\overset{gr.}{0.26} \times 8 = \overset{gr.}{2.08}$, ſomething above a Farthing.

The *Denarius* being thus ſettled at 8 *d.* of our Money, the *Roman Libra* of Silver 5208 Grains *Troy* will be $8 \times 7 \times 12 = \overset{d.}{672} = \overset{s.}{56} = \overset{l.}{2}\ \overset{s.}{16}\ \overset{d.}{0}$.

	l.	*s.*	*d.*	*f.*
Denarius, - - - - -	0	0	8	0
Quinarius, - - $= \frac{1}{2}$	0	0	4	0
Seſtertius, - - - $= \frac{1}{4}$	0	0	2	0
As, - - - - $= \frac{1}{10}$	0	0	0	$3\frac{1}{5}$
Sembella, - - $= \frac{1}{20}$	0	0	0	$1\frac{3}{5}$
Teruntius, - - - $= \frac{1}{40}$	0	0	0	$0\frac{4}{5}$

Mr. *Smith* has calculated a large Table of *Roman* Sums, at the Rate of 2 *d.* the *Seſtertius*. I wiſh this had been done by a more exact Author; for his Numbers are ſo faulty in many Parts of his Book, that I am afraid the Tables are hardly to be depended upon.

CHAP.

CHAP. III.

Further Conſiderations upon the VALUE *of the* DENARIUS.

I THINK the *Denarius* is rightly adjuſted to our Money in theſe Papers; but it is upon a Suppoſition that the *Denarius* is of its juſt Weight 62 Grains *Troy*, and of the ſame Fineneſs of the *Engliſh* Coin; for a Difference in either of theſe Particulars muſt occaſion an Alteration in the Eſtimate.

As to the former of theſe; 'tis certain that many of the *Roman Denarii* fall ſhort of this Weight by ſeveral Grains, which yet might have had it at their firſt Coinage, ſuch a Loſs being eaſily accounted for by wearing, and other Accidents, in ſo many Hundred Years. It is no more, in very many of them, than what has happened to a leſs Coin of our own in a very few Years; for I have juſt now weigh'd an *Engliſh* Sixpence of King *William*'s, that has loſt ſeven Grains of its due Weight, and I don't doubt but that there are many which have loſt eight.

I cannot, however, be certain that all the *Denarii* had their juſt Weight even in the Time of the Conſuls, from a remarkable Place in *Pliny*, which I ſhall tranſcribe at length, ſince I ſhall have further Occaſion to make uſe of it. *Vide* Plin. *Edit.* Hard. *Tom.* ii. *p.* 627, and runs thus: *Miſcuit denario Triumvir Antonius ferrum. Miſcentur æra falſæ monetæ. Alii e pondere ſubtrahunt, cum ſit juſtum* 84 *e libris ſignari. Igitur ars facta denarios probare, tam jucunda lege plebi, ut Mario Gratidiano vicatim totas ſtatuas dicaverit.*

As to the ſecond of theſe Particulars, the Fineneſs of the Silver, the Antiquarians are not well agreed about it. *Savo-*

tus

tus, whoſe Judgment in thoſe Particulars is much to be relied on, ſays, *La plupart des metalls et monneys antiques Romains ont ête battues ſur le fin.* Vide *Rink.* p. 52.

I am obliged to quote *Rink* for this, as not having *Savotus* by me; and indeed I ſuſpect it relates chiefly to the Gold Coins, which were generally of the pureſt Gold. *Vide Joubert*, p. 17. As to the Silver, the ſame Author maintains that the beſt of the *Conſular Denarii* fall ſhort of the *French* Standard, which as well as the *Spaniſh* is nearly the ſame with ours, by $\frac{1}{6}$ Part. At this Rate, ſince our Standard has about $\frac{1}{13}$ part of Alloy in it, the Alloy of the *Roman Denarius* would have $\frac{1}{6}+\frac{1}{13}$ Parts of Alloy in it, which two Fractions added together make $\frac{19}{78}$ and above $\frac{1}{4}$ of Alloy.

What Experiments were made by Mr. *Joubert* to come at this Concluſion I cannot tell; but I am afraid they were not made upon a ſufficient Number of Coins, or not made with due Exactneſs; for it will quickly appear by the Trials that I made, that the beſt of the Conſular Coins are ſo far from ſinking ſo ſtrangely below our Standard, that they equal, or even exceed it. This I think concluſive againſt Mr. *Joubert*.

As a probable Argument againſt him, I might take notice that the greateſt Debaſement that we read of the Silver in the *Roman Denarius*, was made by the Tribune *Livius Druſus*, who mixed an eighth Part of Braſs with Silver, *A. U. C.* 663, during the Conſulate of *Lucius Marcius Philippus*, and *Sextus Julius*. *Vide* Plin. *Edit. Hard. fol. Tom.* ii. *p.* 612. We are told that the Braſs was of the pureſt; but we are not told what the Silver was; but ſurely it could not be ſo baſe, however, as to ſink to Mr. *Joubert*'s Proportion of Alloy. I ſhall try this afterwards.

There are ſufficient Reaſons to think that the *Romans* were but poor Maſters at refining of Silver, which might poſſibly occaſion a Difference in the Goodneſs of their Coins, by

truſting to Chance for want of a certain Standard. They were able to manage Gold well enough, to which they could not give too much Fire. Silver Ore requires a great deal more Art to bring it to Perfection without great Loſs, than they ever ſeem to have been Maſters of. What has been often obſerved in *England* does no great Credit to the *Roman* Skill in the Management of their Metals; for the Cinders of ſome old Iron-works, ſuppoſed to be theirs, ſtill contain in them ſuch a conſiderable Quantity of good Iron that they are melted over again, in order to extract it.

The fineſt Braſs ſeems to have been leſs weighty than our Copper, eſpecially if the ſpecific Gravity of it be ſet at 9.000, which I own I think too much; becauſe the Eſtimate ſeems to have been made from Pieces of Coin. The violent Force which is uſed in Coinage, makes the Parts of the Metal lie cloſer, and thus increaſes the ſpecific Gravity. The ſpecific Gravity of a Silver Half-Crown of *William* III's, in *Harris*'s Tables of ſpecific Gravity, is ſet at 10.75, whereas, at the Rate of our Standard, it ought to be no more than 10.535. I ſhould rather chuſe therefore to ſet the ſpecific Gravity of Copper at 8.843, and have juſt Reaſon to imagine from the ſpecific Gravity of ſome of the following Coins, that the *Roman Æs puriſſimum* did not come up even to that.

In order to obtain ſome Inſight into this Matter, I took five *Conſular Denarii* and weighed them carefully; firſt in Air, then in Water, that I might not only have their Weights, but their ſpecific Gravities.

1. This was a very fair Coin, ſerrated, and well preſerved: It has on one Side the Head of *Jupiter*, in whoſe Face is a wonderful Mixture of Sweetneſs and Majeſty; at the back of the Head is S. C. and under it O, I ſuppoſe for *Senatus Conſulto*. On the Reverſe is a Victory driving a *Quadriga*. The Letters in the Exergue are ſo confuſed and imperfect, that

that it requires better Eyes than mine to make them out. By the Inſcription S. C. O. the Coin was ſtruck by the Authority of the Senate, which perhaps made the Mint-maſters more careful, than when they wrought by the Authority of the Conſuls, Prætors, Ædiles, *&c.* as they did ſometimes. *Vide* Rink, *p.* 123.

		gr.
The Weight of this Coin,	in Air, is - - - -	61.625
	in Water, - - -	55.875
	Difference - - - -	5.750

The Way to find the ſpecific Gravity is this : As the Difference between the Weight in Air and Water is to the Weight in Air, ſo is 1.000 to the Number ſought. Thus as 5.750 : 61.625 : : 1.000 : 10.717, *&c.* Which laſt Number 10.717, ſhews the ſpecific Gravity. Since the ſpecific Gravity of our Standard Silver, is generally ſet at 10.535, it ſeems at firſt Sight as if this Coin conſiderably exceeded our Standard. Yet if we conſider the ſpecific Gravity of King *William*'s Half-crown, mentioned before, at 10.75, it will appear that this *Denarius* is exceeded by it but a Trifle. Nay, ſince this *Denarius* has a very bold Relief, it muſt have been compreſs'd and condens'd ſo much in the Coinage, that it is a Queſtion whether the Metal of it before Stamping, was any thing heavier than our Standard.

This Coin is ſpecifically heavier than any of thoſe that follow ; conſequently it is of finer Silver : For an Alloy of any baſe Metal will make Silver lighter, Lead only excepted : But we have *Savotus*'s Word for it, that in his Eſſays on antient Coins, he never met with a Grain of Lead in any of them before the Time of *Septimius Severus*, when a Mixture of Braſs and Lead was made uſe of to allay the Silver. *Vide* Joubert. *p.* 22.

This Coin is ſo remarkable, that I cannot leave it without ſome further Obſervations.

1. That as it, after ſo many Ages, falls ſhort of 62 Grains *Troy*, only by $\frac{1}{4}$ of a Grain; I think no Doubt can be made but that it muſt have weighed full 62 Grains.

2. That as it is a *Nummus Serratus*, and yet comes ſo near its full Weight, it muſt either have been notch'd at the Mint before it was delivered out, or notch'd with a Chizzel ſo as to make little Loſs; or, laſtly, that it weighed when it was coin'd, conſiderably more than it does now.

3. That tho' this, and ſome other Coins of the Conſular Kind, may weigh about 62 Grains *Troy*, and be nearly about the Fineneſs of our Standard, and ſo be worth about 8 *d.* of our Money; yet I own, that much the greateſt Part of them fall ſhort, either in Purity or Weight: The Reaſons of which are partly to be collected from the above-cited Place in *Pliny*, as alſo from the Effects of Time, Wearing, Ruſt, and other Accidents. I take this firſt to have been a *Denarius* in Perfection, according to the Notion of the *Romans*; and upon ſuch *Denarii* I have founded my Computation.

I took notice that the ſpecific Gravity of Metals may be increaſed by the Compreſſion in Coinage. This may be confirmed by what happens in other Caſes. The ſpecific Gravity of caſt Braſs, for inſtance, is but 8.000, or at moſt 8.100; whereas the ſpecific Gravity of hammer'd Braſs is 8.349.

I ſhall call this firſt Coin *Jupiter*.

The ſecond I examin'd was a fair one, and but little worn; which had on one Side a Head, I think, ſurrounded with a Diadem; behind it is a Lituus, below it the Inſcription ANCUS. On the Reverſe is a Man on Horſeback with a Dog,

Dog, as I take it, below. To the left of this Figure, is the Inſcription *Philippus.* Immediately below the Horſe and ſeemingly contiguous to it, is an Aqueduct among the Arches, on which is AQVA MARCIA.

		gr.
The Weight of this *Denarius*,	in Air - -	59.625
	in Water - -	53·375
	Difference - -	6.250

The Proportion for finding the ſpecific Gravity, is as 6.250 : 59.625 : : 1.000 : 9·54.

I made two other Trials, one of which brought out the ſpecific Gravity 9.44, the other ſomething leſs; ſo that I ſhall pitch upon 9.44, as moſt likely to be exact; tho' indeed there is very little Difference between any of the three. This ſpecific Gravity is leſs than that of any of the following Coins, and much leſs than ſome of them; and indeed I have Reaſon to think it one of them which *Livius Druſus* allay'd with an eighth Part of fine Braſs; which, as we are told by *Pliny*, he did. It muſt however be obſerved, if his Braſs was as heavy as our Copper at 9.000, his Silver muſt have been very impure, which may thus be made out:

Suppoſe 8 Parts of Metal, 7 of which are of Silver and one of Copper, which laſt has for its ſpecific Gravity 9.000. If we ſuppoſe the Silver at 9.5, the Compound of the two will have exactly 9.4375 for its ſpecific Gravity; which will appear by multiplying 9.5 into 7, the Number of Parts of Silver, which gives 66.5, to this is to be added 9.000 for the ſingle Part of Copper, in all 75.5, which being divided by 8, gives 9·4375. This ſpecific Gravity 9·4375, is the ſame within a Trifle with that *Ancus* was ſet at, *viz.* 9·44.

Were

Were we to debaſe the Copper to 8.000, the ſpecific Gravity of this Silver would be near 9.6. If the Copper was ſuppoſed ſtill lighter, and ſet only at 7.000 the ſpecific Gravity of the Silver would not be quite 9.8. Upon the Whole it is evident, that if the Braſs was pure, the Silver was very baſe; and if we ſuppoſe the Braſs to be ſo debaſed as to have only the ſpecific Gravity 7.000, the Silver would be then alſo baſe, ſince it would fall ſhort of the Standard of pure Silver 11.091 by [11.091 - 9.8=] 1.291. It would alſo fall ſhort of our Standard, even of uncoin'd Silver, 10.535 by 0.735, and of our coin'd Silver 10.535 by 0.95.

I ſhall conclude, upon the Whole, that this was one of *Druſus*'s *Denarii*, and that in Compliment to one of that Year's Conſuls, *Lucius Marcius Philippus*, whoſe Family might poſſibly pretend to be derived from *Ancus Marcius*, the King's Head of that Name was ſtamp'd upon one ſide of the Coin, and on the other *Aqua Marcia*, with the Name *Philippus*.

I think it worth taking notice of, that here is no more of the Conſul's Name upon this Coin than barely PHILIPPVS, without the Title of COS: For tho' the *Romans* ſuffer'd the Triumviri Monetarii to ſet their Names, and little Titles, upon their Coins, yet they were ſhy of the great Magiſtrates, Conſuls, Tribunes, *&c.* whoſe Names and Titles never appear'd upon any Coins ſtruck in their own Times, till the Decay of the Commonwealth.

As I think it very plain, that this *Denarius* was one of thoſe of *Livius Druſus*, ſo I think it probable that the other was one of thoſe ſtruck by the Authority of the Senate; who after they had abrogated all the Conſtitutions of *Druſus* by one Decree, ſeem to have taken the Coinage into their own Hands, and to have raiſed the Coin to as great a Degree of Perfection as ever it had before, if not greater. I ſhall call this Coin *Ancus*.

The

The third *Denarius* that I ſhall conſider has a Head of *Roma* on one Side, having on a Helmet with Wings annexed. The Inſcription is ROMA. On the Reverſe is a Victory and a Quadriga. In the Exergue is the Inſcription M. TVLL.

	gr.
The Weight of this in Air - - -	57.875
Water - -	52.125
Difference - -	5.750

The ſpecific Gravity - - 10.0652, *&c.* - - For as 5.75 : 57.875 : : 1.000 : 10.0652, *&c.*

Notwithſtanding we are able to find the ſpecific Gravity and Weight of this, and the two following Pieces, yet we are more at a Loſs to tell their Value in *Engliſh* Money, or indeed their Proportion to one another in Goodneſs, than in the former Coin; for in that we were told that the Alloy was $\frac{1}{8}$ of pure Braſs, which was of ſome Aſſiſtance in judging what was the Value of the Silver; but in theſe, ſuppoſing they were allay'd with Braſs, as it is probable they were, yet ſince we neither know the ſpecific Gravity of the Braſs, nor of the Silver that is mix'd with it, we can be at no manner of Certainty. I ſhall therefore content myſelf with giving their ſpecific Gravities and Weights, by the former of which we ſhall know, how much the Mixture falls ſhort in Weight of pure or Standard Silver. I ſhall call this Coin *Rome the bigger*, or *Roma Alata*.

The fourth *Denarius* that I tried has no *Alæ* annexed to the Helmet, as far as I can ſee; I ſhall therefore call this only ſimply *Roma*. Upon the back of the Head is X, for *Denarius*. There are either Bigæ or Quadrigæ on the Reverſe,

verſe, but the Coin is ſo much worn, that I cannot tell which; nor can I make out any Letters but the X.

	gr.
This Coin weighs in Air - - -	52.25
Water - -	47.25
Difference -	5.00

Specific Gravity 10.45

The fifth *Denarius* has upon one ſide, what *Hardouin* calls *Caput barbarum* [perhaps for *barbatum*] *& ignotum:* But, for my Part, I take it to be *Jupiter* under the Notion of *Pan*, who upon this Account hath a longer and ſharper Beard than ordinary given him. *Vide* Collier's *Appendix*, under the Word *Pan*.

I ſuppoſe *Panſa* choſe *Pan*, becauſe it had ſome Affinity to his own Name. There are many Inſtances to ſhew how fond even the *Romans* were of Rebus's, little Alluſions, *&c.* The firſt of the *Cæſars*, who had any thing relating to him ſtamped upon the Coin, was ſadly put to it, when he was forced to run to the *Punick* Language for the Word *Cæſar*; which in that Tongue ſignified an Elephant. However, when he had once made himſelf Maſter of that lucky Diſcovery, he put an Elephant inſtead of his own Name upon the Coin. *Cicero's Cicer*, &c. ſhew the Humour of a People, whoſe fine Taſte did not hinder them from reliſhing ſuch things as we juſtly take to be Puerile.

The Reverſe of this Coin has *Jupiter* ſitting half naked; his Right-hand ſtretched out, and ſeems to me to hold a Patera; tho' *Hardouin*, whoſe Coin was fairer than mine, takes no Notice of it. In his Left-hand he has a Haſta Pura. The Inſcription in mine is only, IOVIS AXVR, the reſt of the Letters are worn away, but may be ſeen in *Hardouin* on *Pliny*, together with an Interpretation of IOVIS AXVR, which

which is too whimſical to be repeated, much leſs confuted.

The conceited Poſitiveneſs of *Hardouin*'s Countryman * *Ruæus* upon *Virgil*'s *Jupiter Anxurus*, is very remarkable; who from this very Coin concludes, that *Jupiter Anxurus* had a Beard, and vilifies *Servius*, &c. for holding the contrary: And yet is is evident that the Inſcription *Jovis Axur* runs round the Figure without a Beard, *Jovis nondum barbati*; and therefore belongs to that, and not to the Head on the other Side.

This Coin is very remarkable upon one Account; for it will go a great way towards deciding a Diſpute among the Antiquarians, *viz.* Whether there were ever ſtruck more than one Coin with the ſame Die; for I have two of the *Panſas* which agree with one another to a Tittle, and both of them with *Hardouin*'s *Panſa* in thoſe Parts that are fair and diſtinct. Indeed I could never be of the Opinion of thoſe againſt whom this Argument is levelled; for at this Rate the Charge of Coinage muſt have, by many Degrees, exceeded the Value of the Pieces coin'd, which would have been an Expence altogether incredible, needleſs and ridiculous.

	gr.
Panſa weighs in Air - - -	53.000
Water - - -	47.625
Difference - -	5·375

Specific Gravity 9.860, *&c.*

* *Æn.* vii. 799.

The Weights of theſe Coins are as follow :

	gr.	*ſp.Gr.*
Jupiter -	- 61.625	10.717
Roma - -	- 52.25	10.45
Roma alata -	57.875	10.0652
Panſa -	- 53.000	9.86
Ancus -	- 59.625	9.54

I perceive by this Table, that Mr. *Joubert* was wrong in ſaying that the beſt of the Conſular Coins fell ſhort of our Standard by $\frac{1}{6}$ Part, but it is true enough of the middling ones; for it will appear that Mr. *Joubert*'s Proportion will bring out the ſpecific Gravity 10.279, which is leſs than the ſpecific Gravity of *Jupiter* and *Roma*, but greater than that of any of the reſt. According to Mr. *Joubert*, there are in the *Conſular Denarius* 5 Parts of Silver, at 10.535 ſpecific Gravity, and one Part of Alloy, which if it be of fine Copper, will have the ſpecific Gravity 9.000.

Let 10.535 be multiply'd by 5, the Number of Parts of Silver, it gives - - - -	52.675
To which if we add for the one Part of Copper	9.000
They will make - - -	61.675

Which being divided by 6, the whole Number of Parts, it will give 10.279, the ſpecific Gravity, as above.

The Copper is ſet rather too high at 9.000, for Reaſons given before ; but if it were reduced to 8.000, it would give for the ſpecific Gravity 10.1125, which ſtill exceeds the ſpecific Gravity of all the *Denarii* but the two firſt.

Upon

Upon the Review of the Whole, it may be obſerved,

1*ſt.* That the ancient *Conſular Denarius* was about as fine as our Standard, and probably continued in that State till it was adulterated by *Livius Druſus*. This happen'd *A. U. C.* 663. Silver was firſt coin'd at *Rome*, *A. U. C.* 485, as we are inform'd by *Pliny*, *Edit. Hard. Fol. Tom.* ii. *p.* 610; ſo that there was a Run of good Silver 178 Years. After the Debaſement by *Druſus*, the Senate ſeem to have reſtored the Money, at leaſt to its former Purity, in which State it probably continued for ſome time: I ſay *at leaſt* to its former Purity; for thoſe of the moſt antient Conſular Coins, which were ſuch as had the * *Roma alata* upon them in my Collection, do not come ſo near our Standard as *Jupiter*, which is a *Nummus Serratus*, and was probably ſtruck about this time; for *Marius Gratidianus* is ſuppoſed to have been the Inventor of the *Nummi Serrati*, which after the Fineneſs of the Coin was reſtored, was deſigned to prevent Counterfeits. The Deſign had its Effect for ſome time; but the falſe Coiners afterwards made a Shift to imitate them; ſo that they were forced to have Recourſe to making Holes in them, as was practiſed in *England* in our Time. *Vide* Rink, *p.* 65. However, *Marius Gratidianus* grew extremely popular by his Invention, which yet did not ſecure him from being barbarouſly butcher'd by *Sylla*.

The old *Conſular Denarius*, as I ſaid before, falls ſomething ſhort of our Standard, but yet comes ſo near it, that when it is of its full Weight, 62 Grains *Troy*, it will be about 8*d.* of our Coin.

As to the *Nummi Serrati*, their Value was ſo well known, that even the *Germans* were not ignorant of it: *Germani pecuniam probant veterem & diu notam, Serratos, Bigatoſque.*

* *Vide* Rink, *p.* 5, 6.

Vide *Tacit. Lipſ. p.* 437. Thoſe *Nummi Serrati* were pretty common till the Time of *Auguſtus*; but * *Joubert* ſays he never ſaw any after that.

2 *dly*, My Computation has nothing to do with any of the *Denarii* but the Conſular ones in perfection; for they began to degenerate, either in Weight, Fineneſs, or both, even before the total Ruin of the Commonwealth. Afterwards they ſunk in Value from our 8 *d.* to 7 *d.* and 6 *d.* and I know not what.

3*dly*, I took notice before that *Biſhop Hooper* ſets the *Denarius* at 64 Grains *Troy*. I don't ſuppoſe that either he or any body elſe, ever ſaw or heard of a *Roman* Denarius of that Weight: However, as there are many Paſſages in antient Authors, which imply that the *Roman* Denarius was the ſame with the *Attick Drachma*, which is known to be 67 Grains, I imagine the *Biſhop* had a mind to trim the Matter, and make the *Denarius* 64 Grains *Troy*, inſtead of 62, that he might bring it nearer the *Drachma*. He might, for ought I know, have a better Reaſon; for if he had not, this is a very inſufficient one: And when his Hand was in, he might as well have halved 5 Grains, the Difference between the *Denarius* and *Drachma*, and ſo have brought the *Denarius* to 64 $\frac{1}{2}$ Grains, inſtead of 64.

As an Addition to what has been ſaid upon this Subject, I ſhall out of Curioſity examine what a *Denarius* of pure Silver weighing 62 Grains *Troy* would be worth in our Money; which may thus be found out.

Our Pound *Troy* of 240 Pennyweight, is coin'd into 62 Shillings, or 744 Pence. If from $240^{Pww.}$ we take $18^{Pww.}$ for the Alloy, there will remain $222^{Pww.} = 5328$ Grains *Troy* of pure Silver, which are contained in 744 Pence. Then as

5328

* *Vide* Knowledge of Medals, *p.* 131.

5328 : 744 : : 62 : 8.65 d., which 8.65 is a ſmall matter above 8.2½ d. f.

Since the ſpecific Gravity has been ſo often mentioned in theſe Papers relating to the *Denarius*, it may be worth while to take Notice of Dr. *Barrow*'s Method of finding the Quantity of two known Metals in any Mixture without diſſolving the Maſs. As for Inſtance: The Quantity of Silver and Gold in *King Hiero*'s Crown. His Method to do this was by finding the Spaces taken up by Maſſes of Gold, Silver, and the Mixture of equal Weight. There is a great deal of Trouble in finding out theſe Spaces in the Method of * *Archimedes*, and indeed it is neither certain nor practicable in ſmall Maſſes; but they are eaſily found out by the Knowledge of their ſpecific Gravities.

Suppoſe, for inſtance, a Maſs of Gold of the ſpecific Gravity 20.000, an equal Maſs of Silver 10.000; if theſe two be added together, and divided by 2, they would give the ſpecific Gravity of the Mixture 15.000. Theſe three equal Maſſes then of Gold, Mixture, and Silver, are in Weight to one another as 20.15.10. In order to find out the Spaces taken up by Maſſes of Gold, Mixture, and Silver of equal Weights, we muſt proceed by the reciprocal Proportion of their ſpecific Gravities. The Gold was, for Inſtance, to an equal Maſs of Silver by the Suppoſition as two to one; therefore the Space taken up by a Maſs of Silver equal in Weight to the Gold, as 2 to 1. And the like will happen in all Caſes whatever, the Proportion being obſerved. For the reſt *vide* Barrow *on* Archimedes, *p.* 284.

I was willing, before I put an End to this long Chapter, to get a little Information of the *Roman Æs*; but not having any more antient Coin of Braſs than an *Auguſtus*, I put that

* *Vide* Vitruv. *lib.* ix. *cap.* 3.

to

to the Trial: It is of the *Æs rubrum*, or what we call Copper, and of a good Colour.

	Pw.	*gr.*	*gr.*
Its Weight in Air was	4 .	18 $\frac{3}{4}$ =	114.75
Water	-	-	102.25
Difference	-	-	12.50

Specific Gravity 9.18,

which exceeds the ſpecific Gravity of our fineſt coin'd Copper by 0.18; but if we conſider the Compreſſion made Uſe of in the *Roman* Coinage, which muſt have been far greater than in ours, this Exceſs of ſpecific Gravity may be owing to that Cauſe, and ſo the fineſt *Æs rubrum* of the *Romans* may well enough be ſet at the ſame Standard with our own.

I afterwards tried an *Agrippa* of a worſe-looking Copper, and not altogether free from Dirt and Ruſt. This weighed

	gr.
In Air - -	171.377, *&c.*
Water - -	150.625
Difference - -	20.752

Specific Gravity 8.25;

which ſhews its Metal to be much baſer than the former, and even than that of our Coin in King *Charles* the Second's Reign. Moſt of the Imperial Coins that I have, came nearer the Colour of *Agrippa* than *Auguſtus*.

I ſhall add two more Experiments relating to the Compreſſion by Coinage, and the Increaſe of ſpecific Gravity thereupon enſuing.

I took

I took a *S. S. Shilling of King* George *the Firſt*, which weigh'd

		gr.
In Air	- - - -	91.6
Water	- - - -	83.0
Difference	- - -	8.6

Its ſpecific Gravity 10.6511.

This exceeds the ſpecific Gravity of our Standard uncoin'd Silver, which is only 10.535; but falls ſhort of that of *King* William's *Half-crown*, mention'd before, which amounts to 10.75. If there be no Miſtake in *Doctor Harris*'s Numbers or mine, the Half-Crown, by being letter'd upon the Edges, is more compreſſed and condenſed in Proportion, than the Shilling.

I had ſome Suſpicion that the Difference was, in ſome meaſure owing to the poor Relievo of *King George*'s Silver Money, *&c.* therefore I took a Shilling of *King Charles the Second* with a bolder Relievo, and well preſerved.

		pw.	*gr.*	*gr.*
This weigh'd in Air	- - -	3 .	20 =	92.000
Water	- - -	3 .	$11\frac{3}{8}$ =	83.375
Difference	- - -			8.625

The ſpecific Gravity 10.666, *&c.*

This exceeds the ſpecific Gravity of the former; but does not come up to that of King *William*'s Half-Crown.

CHAP.

CHAP. IV.

Of the ROMAN MEASURES *of Capacity for Liquids.*

THESE are eaſily had when the *Congius* is known. The *Doctor* has given us in his Book three *Congii*.

1. That of *Villalpandus* of 207.4737 ſolid Inches. *Vide* Arbuthnot, *p.* 81. How far this may be depended upon may be ſeen before.

2. *His own* Congius, which is deduced from the Pound, *&c.* according to his Eſtimate. This *Congius* gives 207.0676 ſolid Inches, and is what the *Doctor* makes Uſe of in his Tables. *Vide* Arbuthnot, *p.* 82. It differs from the *Congius* of *Villalpandus* by only $\overset{\text{ſ. In.}}{0}.\overset{\text{Dec.}}{4061}$. This *Congius* in the *Doctor*'s Tables is ſet $\overset{\text{Pints.}}{7}\text{——}\overset{\text{ſ. In.}}{4}.\overset{\text{Dec.}}{942}$. The Objections againſt his Pound hold equally againſt his *Congius*, for if his Pound be too large, his *Congius* muſt be ſo too.

3. The *Doctor* gives us a *Congius* deduced from the *Roman* Foot, which *Congius* conſiſts of 195.3139 ſolid Inches, and falls ſhort of *Villalpandus*'s by 12.1598 ſolid Inches. *Vide* Arbuthnot, *p.* 81.

4. A fourth *Congius* may be had from *Pætus*'s *Roman* Ounce of 416.610 Grains *Troy*, which will bring out the *Congius* 197.3415 ſolid Inches. This exceeds the third *Congius* by only 2.0276 ſolid Inches.

5. This is taken from *Savotus*'s *Roman* Ounce 411.875 Grains *Troy*. This *Congius* conſiſts of 195.0986, *&c.* ſolid Inches, and differs very little from the third, ſince it falls ſhort of it by no more than 0.2153 ſolid Inches.

6. A ſixth may be had by the Ounce of 434 Grains *Troy*, which is deduced from the *Denarius*, as I have ſtated it at 62 Grains *Troy*. This *Congius* is in Weight, I mean contains Water of the Weight of 52080 Grains *Troy*, which may be thus made out. A *Sextarius* contains 20 *Roman* Ounces of Water, and a *Congius* 6 *Sextarii*. If therefore my Ounce of 434 *gr.* be multiplied into 20×6 it will give 52080 Grains *Troy* for the *Congius*. Theſe Grains being reduced into Inches, after Dr. *Arbuthnot*'s Method, *p.* 81. will make this ſixth *Congius* of 205.5789 ſolid Inches. *He makes* 760 *gr. equal to* 3 *ſolid Inches*. Then

Gr. ſ. I. Gr. ſ. I. Dec.

As 760 : 3 : : 52080 : 205.5789.

Some Perſons may perhaps think the *Denarius* ſet too high at 62 Grains *Troy*, and chuſe to ſet it at 61. By this Eſtimate we ſhould have a

7. Of 51240 Grains *Troy*, which would conſiſt of 202.2631 ſolid Inches, and would differ from the *Congius* at a Medium deſcrib'd in the next Chapter of dry Meaſures by no more than 0.977 Parts of a ſolid Inch.

The *Congii* ſtand thus :

	ſol. In. Dec.
Villalpandus's,	207.4737
Arbuthnot's,	207.0676
My Firſt,	205.5789
My Second,	202.2631
Pætus's,	197.3415
Arbuthnot's from the *Roman* Foot,	195.3139
Savotus's,	195.0986

Before we can adjuſt the *Congius* to the *Engliſh* Liquid Meaſures, we muſt know how many ſolid Inches are in our Wine Gallon, Pint, *&c.*

It is commonly ſuppoſed, that there are in the Wine Gallon 231 ſolid Inches. Upon this Suppoſition, which is a falſe one, and yet made Uſe of by Dr. *Arbuthnot* and others, the eighth Part of a Gallon, or Pint, will be $\frac{231}{8}=28\frac{7}{8}=28.875$ ſolid Inches. The *Congius* will be found by this Proportion:

As $\overset{\text{ſol. In.}}{28.875} : \overset{\text{Pt.}}{1} :: \overset{\text{ſol. In.}}{205.5789}$ to a fourth Number, which will give the Pints, &c. in the *Congius*. This fourth Number is $\overset{\text{Pt.}}{7}+\overset{\text{ſ. In.}}{3}.\overset{\text{Dec.}}{4539}$.

Since Dr. *Arbuthnot*'s *Congius* contains $\overset{\text{Pt.}}{7}+\overset{\text{ſ. In.}}{4}.\overset{\text{Dec.}}{9426}$, the Exceſs of his *Congius* above mine will be $\overset{\text{Pt.}}{0}+\overset{\text{ſ. In.}}{1}.\overset{\text{Dec.}}{4887}$.

So much for the Eſtimate of the Wine Gallon made Uſe of by the Gaugers, and by which the Exciſe is paid; but they who are concern'd, know well enough that it is wrong: For by an Experiment tried before ſeveral of our moſt eminent Philoſophers in public Poſts, as *Flamſtead*, *Halley*, &c. at which Mr. *Ward* was preſent, the Wine Gallon amounted to no more than 224 ſolid Inches; at which Rate the Pint will be exactly 28 ſolid Inches. The Proportion will now ſtand thus:

As $\overset{\text{ſ. In.}}{28} : \overset{\text{Pt.}}{1} :: \overset{\text{ſ. In.}}{205}.\overset{\text{Dec.}}{5789} : \overset{\text{Pt.}}{7}+\overset{\text{ſ. In.}}{9}.\overset{\text{Dec.}}{5789}$.

The Difference now between us is more conſiderable; for my *Congius* will exceed his by 4.6363 ſolid Inches.

	Pt. ſ. In. Dec.
My *Congius* being -	7+9.5789
His - - -	7+4.9426
Exceſs above his -	0+4.6363

The

The *Congius* according to my Eſtimate is

	Pt.	ſ. In.	Dec.
	7 +	9.5789.	

	Pt.	ſ. In.	Dec.
The *Sextarius*, or 6th Part of it, - -	1 +	6.2631	
The *Hemina*, $\frac{1}{2}$ of Sextarius, - -	$\frac{1}{2}$ +	3.1315	
The *Quartarius*, $\frac{1}{4}$ of Sextarius, - -	$\frac{1}{4}$ +	1.5657	
The *Acetabulum*, $\frac{1}{8}$ of a Sextarius, -	$\frac{1}{8}$ +	0.7828	
The *Cyathus*, $\frac{1}{12}$ of Sextarius, - -	$\frac{1}{12}$ +	0.5219	
The *Ligula*, $\frac{1}{48}$ of Sextarius, - -	$\frac{1}{48}$ +	0.1304	

Theſe being found out by dividing the *Congius*, the reſt of the Meaſures may be found out by multiplying it.

	Gal.	Pt.	ſ. In.	Dec.
The *Urna* is 4 *Congius*'s, - -	3 +	5 +	10.3156	
The *Amphora* is 8 Congius's -	7 +	2 +	20.6312	
The *Culeus* is 20 Amphora's -	146 +	6 +	20. 624	

	E. Gal.	Pints.	ſol. In.	Dec.
Ligula, - -	000	$\frac{1}{48}$	00.1304	
Cyathus, - - -	000	$\frac{1}{12}$	00.5219	
Acetabulum, - -	000	$\frac{1}{8}$	00.7828	
Quartarius, - -	000	$\frac{1}{4}$	01.5657	
Hemina, - -	000	$\frac{1}{2}$	03.1315	
Sextarius, - -	000	1	06.2631	
Congius, - -	000	7	09.5789	
Urna, - - -	003	5	10.3156	
Amphora, - -	007	2	20.6312	
Culeus, - - -	146	6	20. 624	

	Gall.	Pint.	ſ. In.	Dec.
Dr. *Arbuthnot*'s *Culeus*, in his firſt Tables, corrected by the Pen, contains	143 +	3 +	11.328	
and conſequently falls ſhort of mine	3 +	3 +	9.296	

	Gall.	Pint.	ſ.I.	Dec.
In his Tables printed with his Book, the *Culeus* is —— ——	143	+ 3 +	11	·095
which falls ſhort of mine ——		3 +	3 +	9·529

Before I quit this Subject of the Liquid Meaſures, I cannot help taking Notice of a Fault in Dr. *Arbuthnot*, P. 124, in relation to the *Cyathus*.

Upon a Suppoſition that *Budæus*'s Emendation of a Paſſage in *Pliny* is right, he ſays, That the *Cyathus* of *Opimian* Wine came to two *Nummi*. It is ſtrange, that he ſhould ſubſtitute the *Cyathus* inſtead of the *Uncia*; for the *Uncia* alone is mentioned by *Pliny*, and there is not a Word in this Place relating to the *Cyathus*.

He could not have ſo far forgot himſelf, as not to know that the *Cyathus* and *Uncia* were two quite different Things; for the *Cyathus* was $\frac{1}{12}$ Part of the *Sextarius*; but as the *Sextarius* contain'd 20 Ounces of Water or Wine, a ſingle Ounce was only a $\frac{1}{20}$ Part of it. Therefore the *Cyathus* was to the Ounce as 20 to 12, or exactly as 1.666, &c. to 1, and conſequently the *Cyathus*, exceeded the Ounce by above one Half. This being the Caſe, he muſt certainly have ſubſtituted the *Cyathus* inſtead of the *Uncia*, in order to make his Computation of Intereſt agree with what he imagined to be *Pliny*'s. The Place in *Pliny* is certainly a very difficult one, and was *Hardouin*'s Explanation of it right, the Ounce of *Opimian* Wine was ſold for 960 *Seſtertii*, or 8 Pounds of our Money, according to my Value of a *Seſtertius*; a Price altogether monſtrous and incredible. *Vide* Plin. *Edit.* Hard. *Tom.* i. *p.* 714.

By *Budæus*'s Emendation of *binis* inſtead of *vini*, the Ounce was ſold for no more than 2 *Seſtertii*; a wide Difference this in their Accounts! but I think neither of them right, nor indeed capable of being reconcil'd to *Pliny*.

I ſhall

I ſhall therefore venture at another Emendation, and inſtead of *vini*, read *nummo*: This Emendation is not ſo forced as it may ſeem at firſt Sight; for I don't imagine that *nummo* was written at Length in that Place, but only its Character *N*. Vid. *Sertorius Urſatus*, which afterwards might eaſily become *NI* by the Careleſneſs or Ignorance of the old Librarians. *NI* not being underſtood by the following ones, and the Subject being *vinum*, they changed *NI* into *VINI*. If this be admitted, the Ounce of Wine was ſold for a *Nummus* or *Seſtertius* and all will be eaſy; which may thus be made out:

The *Amphora*, which contain'd 960 Ounces, was ſold at firſt for 100 *Nummi*; at this Rate the Ounce was worth little more than 0·1 of a *Seſterce*. But a hundred and ſixty Years afterwards, the Intereſt of a 100 *Nummi* at 6 *per Cent.* would amount to $160 \times 6 = 960$ *Nummi*, which being added to the principal 100, would make 1060 *Nummi* in all. If this Sum be divided by 960, the Number of Ounces in an *Amphora*, it will give 1.1 *Seſtertius* for the Value of an Ounce; and as the Fraction is but a ſmall one, and probably was neglected in Trade, an Ounce of this *Opimian* Wine was ſold for a *Nummus* or *Seſtertius*. Indeed *Pliny* ſeems to have neglected the Principal of 100 *Seſtertii* in his Account, and to have regarded only the Intereſt 960 *Seſtertii*, at which Rate the Price of an Ounce of this Wine would be preciſely one *Nummus* or *Seſtertius*.

I think this is rating the Price high enough; for if the *Seſtertius* be ſet at 2 *d.* which I take to be the true Value of it, the *Sextarius* which contain'd 20 Ounces, and exceeded our Pint only by a ſmall Fraction, would have coſt 3 *s.* and 4 *d.* of our Money; and two *Sextarii*, nearly our Quart, 6 *s.* and 8 *d.* This I think was a fair Price for Wine at that time of day, when Wine was ſo exceſſively cheap as

to

to be ſold ſometimes at 2 *d.* a Gallon, or leſs *. *Vide* Arbuthnot, *p.* 125, 126.

All that Dr. *Arbuthnot* ſays about the *Cyathus* is foreign to the Purpoſe, as alſo what he has about the *Anatociſmus*; for *Pliny* ſays nothing about the *Anatociſmus*, and but barely mentions the *Uſura modica & civilis*, which was *multiplicata ſemiſſibus*, or 6 *per Cent.*

As to the *Anatociſmus*, it ſeems to have been reckon'd oppreſſive, and yet ſome Uſurers ſeem not content with it, tho' they had 12 *per Cent.* beſides, for their Money: *Nihil impudentius Scaptio, qui centeſimis cum anatociſmo contentus non eſſet.* Vide *Cicer. ad Attic.* lib. v. Ep. 21. Arbuthnot, p. 210.

If the former Emendation appears too harſh, I know no other Method of ſetting Matters right, but by ſuppoſing that if the old reading *ſingulas uncias* VINI *conſtitiſſe*, be right; *HS* has been dropp'd by the Librarians, after *vini*; but if *Budæus*'s Conjecture hold good, who reads BINIS inſtead of VINI, the *S* in *HS* muſt have been dropp'd, and the Legs of the *H*, or *II*, made *binis*; or what is ſtill more probable, out of *IIS* was made *Binis.*

Faults of this Kind are ſo very common in ancient Authors, that it is to be lamented that they did not write all their Sums, Dates, *&c.* in Words at length, inſtead of any numerical Characters whatever: An Error in a little Character often confounds a great Sum, and the common Writers

---

* What is ſaid here is upon a Suppoſition that the *Romans* took Wine and Water to be of the ſame, or nearly the ſame ſpecific Gravity. *Vide* Arbuthnot, *p.* 91, 92. *Lowthorp*'s *Abridgment of the Philoſophical Tranſactions*, I. p. 610. But above all, *Fannius* in *Ward*'s *Diſſertation de Aſſe. Monum. Kempian.* p. 49.

ſeem

ſeem to have been of the ſame Temper with our common Printers. There was ſo much Money to be paid for ſo much Work; if they could get their Money, they were not at all ſollicitous whether their Work was executed well or ill.

Since I wrote what went before about the *Cyathus*, I have met with another Miſtake relating to the *Cadus*, ſo that I am afraid the *Doctor* was not over exact in his Quotations and Tranſlations: His Words are, *Page* 93, "that *Julius* "*Cæſar* at his triumphal Supper, according to *Pliny*, *lib.* 14. "*cap.* 15. gave 100 *Cadi* of *Chios* Wine, that is, 4 Tuns, "25 $\frac{1}{2}$ Gallons." I am at a Loſs how to reconcile this with the Words of *Pliny*, which are theſe, *Cæſar Dictator triumphi ſui cænâ vini Falerni amphoras, Chii cados in convivia diſtribuit.* Here is another of 100 *Cadi*, which, were we to ſet the *Cadus* at the higheſt, would have been but a Trifle at a triumphal Entertainment, eſpecially at one of *Cæſar*'s.

The *Cadus*, according to *Hardouin*, is by ſome Authors ſet at 10 *Congii*, by others at 12. *Vide* Plin. *Tom.* i. *p.* 722. Dr. *Arbuthnot* ſays, *Page* 93. that *the* Cadus *was the ſame with the* Metretes, which by his Tables contains

Gall. Pint. ſ. In. Dec.
10 — 2 — 19.626. *Pag.* 83. He ſeems to make the *Cadus* the ſame with the *Amphora*, which he ſets at

Gall. Pint. ſ. In. Dec.
7 — 1 — 10.66.

Pliny's Meaning plainly is, that *Cæſar* gave to each Set of Company an *Amphora* of *Falernum* and a *Cadus* of *Chian* Wine. The ſingle Sets did not conſiſt of many Perſons, but then they were vaſtly numerous; ſo that there muſt have been an Expence of Wine far beyond what our Author mentions. If he had reflected upon what he ſays, tho' not very exactly, at *Page* 131, that *Cæſar* borrow'd of

Hirrius

Hirrius 6000 *Lampreys for one of his triumphal Suppers*, beſides what he probably bought and had of his own, or from Friends, and had conſider'd that there muſt have been other Eatables, and Wine in Proportion, he would have found that there were ſo many thouſand Gueſts at one of theſe Entertainments, that 100 *Cadi* of *Chios* Wine would hardly have been a Taſte for each.

CHAP.

CHAP. V.

Of ROMAN MEASURES *of Capacity for Things dry.*

THESE may be adjuſted to *Engliſh* Pecks, Gallons, *&c.* by comparing the ſolid Inches in the *Modius* with thoſe in the *Engliſh* Peck, between which there is but little Difference. The ſolid Inches in the *Modius* are found by thoſe in the *Congius*; which, according to my Computation, are 205.5789. For 8 *Congii* = 1644.6312 ſolid Inches make an *Amphora*, which contains 3 *Modii*, conſequently, if $\overset{\text{ſ. I.}}{1644}.\overset{\text{Dec.}}{6312}$ be divided by 3, we ſhall have for the *Modius* $\overset{\text{ſ. I.}}{548}.\overset{\text{Dec.}}{2104}$.

We have two different Eſtimates of the ſolid Inches and Decimals in the *Engliſh* Peck.

The firſt is $\overset{\text{ſ. I.}}{544}.\overset{\text{Dec.}}{5}$; this is the common Reckoning. If this ſuppoſed Peck be taken from my *Modius*, it would leave a Difference of $\overset{\text{ſ. In.}}{3}.\overset{\text{Dec.}}{7104}$, and conſequently the *Modius* would be $\overset{\text{Peck.}}{1} - \overset{\text{ſ. I.}}{3}.\overset{\text{Dec.}}{7104}$.

The ſecond Eſtimate of the *Engliſh* Peck, which is the true one, according to *Ward*'s *Young Mathem. Guide*, p. 36, is $\overset{\text{ſ. I.}}{537}.\overset{\text{Dec.}}{6}$. This would bring out the *Modius* that I ſhall ſtick to, $\overset{\text{Peck.}}{1} - \overset{\text{ſ. I.}}{10}.\overset{\text{Dec.}}{6104}$.

The *Congius* which the *Doctor* makes Uſe of in order to find his *Modius*, is $\overset{\text{ſ. I.}}{207}.\overset{\text{Dec.}}{0676}$; which being multiplied by 8, gives the *Amphora* $\overset{\text{ſ. I.}}{1656}.\overset{\text{Dec.}}{5408}$. This being divided by 3, gives the *Modius* $\overset{\text{ſ. I.}}{552}.\overset{\text{Dec.}}{1802}$.

If from this be taken the firſt or common *Engliſh* Peck $\overset{\text{ſ. I.}}{544}.\overset{\text{Dec.}}{5}$, it will leave a Difference of $\overset{\text{ſ. I.}}{7}.6802$, or throwing off the two laſt Decimals $\overset{\text{ſ. I.}}{7}.68$, and conſequently his *Modius* will be $\overset{\text{Peck}}{1}$ —— $\overset{\text{Gall.}}{00}$ $\overset{\text{ſ. I.}}{7}.68$, as he has rated it in his Tables.

	Peck	Gall.	ſ. In. Dec.
The *Doctor's* Modius then is -	1	00	7.68
Mine - - - - -	1	00	10.6104
Difference - - -	0	00	2.9304

which is all the Exceſs of mine above his.

Theſe ſolid Inches are too inconſiderable to be minded in ſmall Matters; but as they amount to $\overset{\text{ſ. I.}}{183}.45$*th* Part of my Peck, it is evident that in 183.45 *Modii*, my Meaſure would exceed his by about a Peck.

The *Modius*, with its Diviſions, will, according to my Eſtimate ſtand thus, neglecting the Decimals of the 5th Place and beyond it:

	Peck	*Gall.*	*Pint*	*ſ.I. Dec.*
The *Modius*, - -	1	0	00	10.6104
Semimodius, -	0	1	00	5.3052
Sextarius, - -	0	0	1	0.6631
Hemina, -	0	0	$0\frac{1}{2}$	0.3315
Acetabulum, -	0	0	$0\frac{1}{8}$	0.0828
Cyathus, -	0	0	$0\frac{1}{12}$	0.0552
Ligula, - -	0	0	$0\frac{1}{48}$	0.0138

It is perhaps worth obſerving, that if we were to compute the *Modius* between the two Extremes of *Villalpandus* and *Savotus*, we ſhould have a new *Modius*, which would differ from

from the true *Engliſh* Peck by leſs than a ſolid Inch; which will thus appear:

	ſ. In. Dec.
The *Congius* of *Savotus* is - - -	195.0986
Hence his *Amphora* - -	1560.7888
His *Modius* - - -	520.2629
The *Congius* of *Villalpandus* is - - -	207.4737

If theſe two *Congii* be added together, and divided by 2, we ſhall have a *Congius* between the two Extremes *ſ. In.* 201 *Dec.* 2861.

	ſ. In. Dec.
Whoſe *Modius* found as before, will be - -	536.7629
The *Engliſh* Peck is - - - -	537.6000
and therefore exceeds this *Modius* only - -	0.8371

According to this Suppoſition, the *Roman Modius* and *Engliſh* Peck might well be reckon'd the ſame.

A *Congius* computed from the *Denarius* at 61 Grains *Troy*, would be *ſ. In.* 202 *Dec.* 2631, and would differ from the *Congius* at a Medium, by no more than *ſ. In. Dec.* 0.977, which is leſs than a ſolid Inch.

	ſ. In. Dec.
The correſponding *Modius* is - - -	539.3682
The *Engliſh* Peck - - - - -	537.6000
The Difference - - - - -	1.7682

Some may poſſibly like theſe Proportions; but I chuſe rather to keep to my former ones, for Reaſons given in their proper Places.

F I N I S.

E R R A T A.

Page 3, line 10, for *Preparation* read *Proportion.* p. 12, l. 12, for *into the Decimals* read *into Decimals.* p. 14. laſt line, for *7 gr.* $\frac{46}{62}$, *or 7 gr.* 74 read *7 gr.* $\frac{46}{62}$, *or 7 gr.* 0.74. p. 15, l. 2, for 0 26 read 0 . 26. p. 17, l. 2, for *monneys* read *monnoys.* ibid. l. 13, for *and above* read *and is above.* p. 25, l. 7, for *yet is* read *yet it.* p. 29, l. 25, after *Gold,* add *muſt be to the Space taken up by the Gold.* p. 39, l. 15, for *another* read *nothing.*

Juſt Publiſhed,

And ſold by DAN. BROWNE, *at the* Black Swan *without* Temple-Bar, *and* JOHN WHISTON *at Mr.* Boyle's *Head in* Fleet-ſtreet.

ANTIQUITATES ASIATICÆ Chriſtianam Æram antecedentes, ex Monumentis Græcis deſcriptæ, Latinè verſæ, Notiſque & Commentariis illuſtratæ; accedit Monumentum Ancyranum. Ab *Edmundo Chiſhull,* S.T.B. Nummis & figuris æneis ornatæ. *Price* 18 s. *ſewed.*

UNIVERSITY OF CALIFORNIA LIBRARY
Los Angeles

This book is DUE on the last date stamped below.

PSD 2343 9/77

UC SOUTHERN REGIONAL LIBRARY FACILITY
AA 000 101 817 5